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The Lobster Fishery of Wales

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I. INTRODUCTION

THE Scottish west coast, the north-east coast of England and the coasts of Devonshire and Cornwall are all rugged, and the adjacent waters are well known for the lobster and crab fisheries they support.

Many parts of the coast of Wales are also rugged and the Welsh inshore waters might therefore also be expected to carry a considerable population of lobsters and crabs. However little is known about their potentialities in this respect.

The survey reported here was undertaken to study the existing lobster and crab fishery on the coast of Wales and to attempt a first appraisal of the potentialities of this coast for lobster fishing, and the extent to which they are being realised.

Since the determination, with any precision, of the potential yields and optimum fishing intensities for any marine organism requires a knowledge of growth rates and natural and fishing mortalities, the present investigation has only given tentative conclusions on these questions but has indicated areas which are more or less intensely exploited, preparing the ground for more detailed investigations in the future.

However, the description of the present fishery (1954/55) given here is reasonably complete and forms the necessary background to any development which may be possible.

II. HISTORICAL BACKGROUND

THE first systematic accounts of the lobster and crab fisheries of any part of Wales were written about 1914, and therefore the earlier history has to be obtained from the passing references in the accounts of travellers or from the more general accounts of the fisheries of Britain. The earliest reference to lobster fishing in Wales that has been found is that of Bingley (1800) who wrote in his book 'North Wales' that 'collecting lobsters and crabs occupies most of the time of the inhabitants of Bardsey Island'. The pots, he said, were 'made of willows exactly in the shape of a wire mouse trap, with the cone inverted'; they had weights tied to them and were fished singly. The catch, Bingley writes, was sent to Liverpool by boat; this will have been the regular service of Liverpool boats that plied to the ports of Wales before there was much inland transport.

Pennant (1810) in his 'Tours of Wales' published in the first decade of the nineteenth century, refers only once to lobsters, recounting that at Pwllheli 'the traps for lobsters are made with pack thread like thief nets and baited with pieces of lesser spotted shark', although he discusses herring, mussel and other fisheries at some length. Holdsworth (1874), in his general account of fisheries and boats of England and Wales, does not mention lobsters and crabs on the Welsh coast and says that, at that time, the Welsh people appeared little interested in developing fisheries, the majority of the fishing being done by English boats visiting the Welsh coast.

In 1876 an enquiry into the condition of the crab and lobster fisheries of England and Wales, Scotland and Ireland, was made under government auspices (Buckland, F., Walpole, S. *et al*, 1877) and while the commission visited and took evidence at many localities in England, Scotland and Ireland, they did not consider it necessary to visit a single Welsh port and no reference is made to Welsh fishing except in the title of their report. This presumably indicates that fishing for lobsters and crabs in Wales was very little developed at that time.

In 1885 Davies wrote a general account of the fisheries of Wales as an essay for the National Eisteddfod in that year, but, although he goes into considerable detail on most aspects, his references to lobster fishing are very limited. Describing the fisheries along the coast from the north southward, no reference is made to lobsters and crabs until he says that at Dinas, near Fishguard, women did a little fishing including lobstering. On the coasts of Cardiganshire and Pembroke he writes that lobster and crabs abound 'and a small trade is done inshore in small boats from each of the little creeks or ports'. He specifically mentions that lobsters and crabs also abound around the cliffs of Caldy Island.

At the time that Davies was writing there was considerable trawl and herring fishing by Welsh and English boats round the Welsh coast, employing in all some 460 boats and over 1,500 men and boys (see also Matheson, 1929), but fishing for lobsters appears to have been restricted to gathering by hand and hook around the rocks at low spring tides and potting from small open boats.

In 1887 the Board of Agriculture began to publish reports by its inspectors, the sea fishery committees were being set up, and the collection of fishery statistics had begun. The early reports included notes on the numbers of boats fishing from each port and the types of fishing being done. These reports show that there was an increase in the numbers of small sailing and rowing boats fishing for lobsters from Milford Haven from about 14 in 1892 to 25 in 1897 and that there were some ten sailing boats working from Holyhead during these years. They also refer to two or three rowing boats working pots from Tenby and St. Dogmaels. However, these reports are clearly incomplete as they do not refer to any lobster fishing from the Lleyn peninsula.

Table 1: *Landings (numbers) of lobsters at Welsh ports (from the report of the departmental committee on inshore fishing, B.A.F.*, 1914)

Place	*Lobsters*			*Crabs*		
	1902–6	1907–11	1912	1902–6	1907–11	1912
Tenby	697	740	3,336	1,024	1,397	10,457
Milford	6,378	3,215	2,888	3,532	2,811	3,413
Newquay (incl. Aberayron)	631	783	392	120	573	446
Aberystwyth (incl. Borth)	–	55	–	–	162	–
Aberdovey (incl. Barmouth)	70	373	215	83	286	394
Pwllheli (incl. Aberdaron and Nevin)	4,090	5,777	7,063	10,051	9,971	15,311
Caernarvon (incl. Bangor and Conway)	163	754	491	–	7	–
Holyhead	1,797	946	252	695	24	–

The first available figures (Table 1) of annual landings of lobsters and crabs in this area refer to 1902 onwards and are published as a supplement to the Report of the Departmental Committee on Inshore Fisheries (Board of Agriculture and Fisheries, 1914). These show that at the turn of the century there was a moderate fishery round Milford and the end of the Lleyn peninsula, but relatively little elsewhere.

The development of the railways to almost their present extent between 1855 and 1865 (Kidner, 1954) might have been expected to have improved somewhat the trade in lobsters with the increase in summer visitors and access to inland markets, but there is no evidence that it had any marked effect. The Liverpool boat continued to call at Bardsey up till 1914

and it was only after about 1910 that Bardsey and Aberdaron lobsters were sent to market by train from Pwllheli.

It would appear therefore that during the last century lobster and crab fishing was very little practised on the Welsh coast except round Bardsey Island, and between Tenby and Milford Haven, though no doubt wherever the coast was rough lobsters were caught for local consumption by hand and hook around the rocks at low tide.

Between 1913 and 1915 a series of studies was undertaken by the Zoology Department of the University College of Wales, Aberystwyth, towards the improvement of inshore fisheries in Cardigan Bay, and in 1915 Durlacher and Walton gave a report on the lobster and crab fisheries. From this report and a note by Jenkins (1913) it is evident that the fisheries of the central and north coasts of Wales were very much divided into the larger boats, many of English ownership, concentrating on trawling and working from the larger ports, and the local small inshore boats working out of both the large and small ports, and turning their hands to lining, fixed nets, salmon, or potting for crabs and lobsters. Both sections were considered to have declined markedly in the early part of the present century, though there is little evidence of much change in the lobster and crab fishery. It appears that lining had been quite an important part of the inshore fishing activities both as a livelihood, especially in winter, and as the major source of bait for those who did potting in summer. Durlacher and Walton mention that at Aberdaron the lobster fishermen collected lugworm, crabs or mussels to bait lines to catch wrasse which in turn were used to catch dogfish that were needed as bait for lobsters and crabs. Fishing on these terms on an exposed coastline with poor harbours indeed needed determination and it is not surprising that many men turned to other work when the railways brought increased trade and visitors and better paid jobs ashore.

Salted gurnard began to be used as bait for lobsters and crabs at Fishguard at this time, and this may have contributed considerably to the development of lobster fishing independent of other types of fishing, which characterises the Welsh lobster fishery today.

Durlacher and Walton gave the following figures for the number of men wholly or partly engaged in lobstering in the various ports in 1914 and these are said to be probably slightly less than those for the average of the previous ten years. The figures in brackets give the total number engaged in line fishing, as well as potting.

Bardsey	8 (8)	Barmouth	0 (1)
Aberdaron	6–7 (6–7)	Aberdovey	0 (2–6)
Rhiw	2 (4)	Aberystwyth	0 (20)
Cilan Head, Abersoch, Llanbedrog	3 (3)	Newquay	1 (?)
		Llangranog, Aberporth	0 (2)
		St. Dogmaels	4 (4)
Pwllheli	0 (5–10)	Fishguard	6–8 (10)
Portmadoc	0 (1)	Strumble Hd. – St. Davids	4 (4)

All the boats were small and open and were worked by one or two men by oars and sail with ten to twenty pots per man, all the pots being fished singly. There appears also to have been a small fishery from Nevin, Porthdynlleyn and from a few ports on Anglesey.

It is seen that there was at this time practically no fishing for lobsters and crabs in mid-Wales, between Abersoch and St. Dogmaels, though the writers say that in the past more fishing had been done for crabs and lobsters from Newquay, and that attempts had been made from Aberystwyth, but that there had been very heavy loss of gear.

Throughout Cardigan Bay the Cornish pot was most widely used, but in the south a netting covered barrel-shaped pot with two lateral entrances held open by hazel twigs was used to a limited extent.

On the south coast of Wales, prior to the 1914-18 war, there appears to have been only a little fishing according to evidence given at the enquiry made by the Departmental Committee on Inshore Fishing in 1914. There was no potting for lobsters on the Gower peninsula, though lobsters were reported to be common there and caught by hand and hook.

A number of small boats worked from points along the Pembrokeshire coast, including Angle, Dale and Marloes.

In 1931 an enquiry into the lobster, crab and crawfish fishing of South Wales was made by the Ministry of Agriculture and Fisheries, and some of the results have been incorporated in a more popular account of these fisheries by Kirkpatrick-Crocket (1933), although the original report has not been preserved.

Little fishing for lobsters and crabs was done east of Tenby but small boats with one or two men each fished from many of the Pembrokeshire bays and creeks. Kirkpatrick-Crocket gives the following numbers of boats and men fishing for crabs and lobsters between Cemmaes Point and Cardiff for 1927, commenting that there had been little change in the numbers since the previous census in 1924.

	Men	*Boats*
Abermawr	1	1
Porth Gain	6	3
Porth Clais	7	3
Solva	4	2
St. Brides Haven	2	1
Little Haven	2	2
Marloes	17	9
Dale	2	2
Angle	12	6

Kirkpatrick-Crocket writes that rowing and sailing boats had been used until shortly before the 1930's, when motor boats began to take their place. It would seem probable, though there are no records, that there had been some lobster and crab fishing around the Pembrokeshire coast for many years.

In the South Wales area the pots were typically of Cornish pattern made of willow, or the French pattern, which was barrel-shaped, made of netting over sticks and hoops with two funnel entrances, but the north-east coast 'creeve' was also to be found.

Up to sixty pots were used per boat, and probably as in the north on the basis of about twenty pots per man. The pots were fished singly or in fleets, but the number of pots to a fleet is not recorded. It appears from these accounts that in 1930 from St. Govan's Head westward and round to Dinas Head some 1,000 to 1,400 pots were fished at the peak of the season, practically all of the pots being set well inshore, though including the shores of Skomer and Skokholm Islands, and occasionally those of the small exposed Grassholm Island.

The situation seems to have been that after 1918 there was a crab and lobster fishery practically all along the Welsh coast but concentrated on Pembrokeshire and the Lleyn peninsula. The fishing was almost exclusively done from small open boats propelled by oar and sail, and fishing 40–50 pots from a boat with a crew of two. During the inter-war period an increasing number of boats were fitted with petrol engines and larger motor-boats were introduced, which will have permitted a general increase in efficiency. There seems to have been no return to a mixed fishing; few boats combined any other fishing than mackerel trolling, or a little fishing with trammel net, line or trawl, for bait.

After the 1939–45 war the trend to larger motor-boats, though largely converted ships' lifeboats, has continued at an increased pace and a few Cornish fishing boats, and one Scottish fishing boat which had been trawling for many years from Pwllheli, are now being used for lobster potting. Capstans worked off the engine, or as a separate unit, are becoming accepted as a necessity and the number of pots being fished has considerably increased, as will be seen in the next section where the present day fishery is described.

III. THE FISHERY IN 1954/55

SINCE the 1939–45 war there has been a considerable development of the Welsh lobster fishing, especially in the central and northern parts of Cardigan Bay. More motor-boats of over 24 feet have been used and, while most of these have been converted ships' lifeboats, a few fishing boats have been brought from Cornwall and one or two inshore boats which had been trawling have turned over largely or completely to lobster fishing. Part of the development has taken the form of Pembrokeshire men moving into central Wales to fish during the lobster season. Thus boats from Milford Haven and Fishguard have been fishing from Aberystwyth and Barmouth. This period has also seen the first real exploration and exploitation of the grounds at a distance from the immediate shoreline. This is particularly true in the Pwllheli area where fishing more than a few hundred yards from the shore was unknown before 1950.

In order to determine the present position, visits were made during 1954 and 1955 to all the ports from which lobster fishing is done and trips to sea with lobster fishermen were made from Holyhead and Llanbedrog by my colleague Mr. G. Davies and from Pwllheli, Newquay, Porth Clais and Milford Haven by the author. The results of interviews and discussions with most of the lobster fishermen and fishery officers on the coast form the basis of this section of the present report. The details of the boats and gear used are summarised as Appendix 1.

Inaccuracies in some details are bound to be present and apologies are now made to any fishermen wrongly reported. However, it is believed that the records are very largely correct and that any inaccuracies present will not materially affect the general picture of the position in 1954/55, a position which is not static but changing slightly every year.

The details given in Appendix 1 of 75 boats include all the fishermen who obtain all or an important proportion of their living from lobster fishing, and also include most, if not all, of those others who, while not depending on lobster fishing as a main source of income, fish more than about fifteen pots regularly and therefore are a significant part of the fishing effort.

There are however, in addition, quite a number of people who have a boat and five to twelve pots and fish for lobsters when good weather and other factors allow. These people include week-end visitors with pleasure launches who put down a few pots, and the local hotel keepers and others who have a few pots out and go round them as frequently as practicable. However, the most important casual lobster fishermen are those who work on the land on remote parts of the coast and have a 10 to 14 foot boat, with or without an engine, and who fish a few pots close to the point where they keep their boat. This fishing probably accounts for several thousand lobsters per year, many of which are used for home consumption or are sold locally and few of which enter the published fishery statistics. Compared with the regular fishing for a living, the number of lobsters caught by these men is very small. Notes of this lesser part-time fishing, but without details, have been given in the appendix wherever enough information has been available to merit an insertion.

1. BOATS, CREWS AND NUMBERS OF POTS

Of the 75 boats that were fishing more than fifteen pots in 1954 and 1955, 24, or nearly a third, were less than twenty feet long and had outboards or no engines (Table 2). These small open boats worked 15 to 40 pots each, close inshore and within a mile or two of the place at which each boat was kept. Most of these fishermen had other work as a major source of income, of which farming was the most important. Rabbit catching had also been an important winter occupation of several of these men before the advent of myxomatosis.

Of the 51 boats with inboard motors, 16 stand out by reason of their considerably greater catches, leaving 35 in an intermediate position. These 35 were boats of various sizes up to 36 ft which were fishing less than 60, and nearly all less than 50, pots each. While the owners of these thirty-five included some who were retired men of other professions

Table 2: *Number of lobster boats of different sizes fishing the coast of Wales in* 1954 *and* 1955 *showing* (*a*) *whether they have inboard, outboard or no engines, and* (*b*) *the number fitted with capstans*

Overall length of boat in feet	*Type of Engine*						*TOTALS*
	Inboard		*Outboard*		*None*		
	Capstan	*None*	*Capstan*	*None*	*Capstan*	*None*	
10 – 14	–	2	–	12	–	5	19
15 – 19	–	6	–	7	–	–	13
20 – 24	2	11	–	–	–	–	13
25 – 29	7	10	–	–	–	–	17
30 – 34	3	4	–	–	–	–	7
35 – 39	2	3	–	–	–	–	5
40	1	–	–	–	–	–	1
TOTALS	15	36	–	19	–	5	75
	51		19		5		

interested in the sea, or regular members of lifeboat crews or pilot-boat crews who were unable to put all their effort into fishing, over half were full-time fishermen making good catches, many of which will have exceeded 2,500 lobsters per season (of 5 to 6 months), the men working alone or in pairs usually without capstans, and placing their pots, often singly, with great skill (Table 4).

The top 16 are the larger boats, nearly all 28 ft to 36 ft long with crews of two, which were working 60 pots or more. These boats are largely converted ships' lifeboats (Plate 1(a)) in which the engine is aft and has been enclosed, forming also a cabin capable of sleeping two men. They also include a fully-decked Scottish inshore boat and a few part-decked Cornish fishing boats (Plate 1(b)). The trend to mechanical hauling of pots has, as would be expected, been most rapid among these larger boats and eleven out of the sixteen haulers installed on lobster boats on the Welsh coasts are on boats in this group (Tables, 2, 3 and 4).

Table 3: *Numbers of boats of different sizes fishing different numbers of pots Boats with capstans shown in brackets*

Overall length of boat in feet	*Number of pots*							
	Less than 20	20 – 39	40 – 59	60 – 79	80 – 99	100 – 119	120	*TOTALS*
10 – 14	2	15	2					19
15 – 19	4	5	4					13
20 – 24		5 (1)	8 (1)					13 (2)
25 – 29		4 (2)	5	4 (2)	2 (1)	1 (1)	1 (1)	17 (7)
30 – 34			3	2 (2)	2 (1)			7 (3)
35 – 39		2 (1)	1	2 (1)				5 (2)
40				1 (1)				1 (1)
TOTALS	6	31 (4)	23 (1)	9 (6)	4 (2)	1 (1)	1 (1)	75 (15)

Table 4: *Numbers of boats fishing different numbers of pots, showing (a) those with or without capstans, and (b) the number in the crew*

Number of Pots	*With Capstan*			*Without Capstan*			*TOTALS*
	No. in Crew			*No. in Crew*			
	1	2	3	1	2	3	
Less than 20	–	–	–	4	2	–	6
20 – 39	4	–	–	21	6	–	31
40 – 59	–	–	–	3	20	–	23
60 – 79	–	6	–	1	2	–	9
80 – 99	–	2	–	–	2	–	4
100 – 119	–	1	–	–	–	–	1
120	–	–	1	–	–	–	1
TOTALS	4	9	1	29	32	–	75
	14			61			

Although a hauler helps in lobster fishing, especially in fishing more pots and for working in deeper water, three of the most successful fishermen still do their hauling by hand.

Thirteen of these boats stood out above the rest in that they were making consistently bigger catches, each landing over the year some 4,800 to 8,000 lobsters.

2. TYPES OF LOBSTER POT

There are probably more types of lobster pot used on the Welsh coast than on any comparable length of coast in the British Isles.

Three generalised types may be recognised: (a) the Cornish ink-well pot with the eye or eyes at the top; (b) the Scottish creel, cottage-shaped, with an entrance on either side; and (c) the barrel-shaped pots. These with their modifications, will be described in turn.

(a) *The Cornish Ink-well Pot*

Only at Porth Clais, Pembrokeshire, are the traditional large Cornish pots still made from local grown willows (Plate 2(a)).

A variant of this pot (Plate 2(c)), is that made and used at Aberdaron, Rhiwand Bardsey Island; these pots are spherical in form with a shallow top opening about 6 inches in diameter. These pots are weighted with three large stones tied to the outside, giving a tripod-like base. The fishermen use them singly and believe they settle in the long seaweed along the rocky cliff base better than other types.

Round most of the Lleyn peninsula, other than at the western extremity where the spherical pot is predominant, a Cornish-type pot, but made of cane, is most commonly used. These pots with a $4\frac{3}{4}$ inches opening are made by one of the larger companies making fishing gear and were retailed in 1955 at 15/6 each.

The Cornish pot made of wire and twine (Plate 3(a)) has recently been adopted widely in mid-Wales, from Fishguard to Barmouth, and is considered to catch well and last well. The dimensions vary greatly according to the maker, but are typically much smaller than the comparable pots used in Cornwall. The bases vary between 23 and 28 inches in diameter, the height between 14 and 22 inches and the internal diameter of the eye between 5 and 8 inches. Most of these wire pots are weighted by means of cement which is poured

into the pot and formed into a disc covering about half of the base and embedding the wires, thus increasing the rigidity of the whole structure.

One fisherman has tried to prevent lobsters leaving the pots, once they have entered, by fixing a simple curtain of shrimp or herring netting round the rim of the funnel to his Cornish type wire and twine pots. The curtain hangs down to within two inches of the bottom of the pot. This method shows promising results.

All these Cornish-type pots are typically baited by the use of twine bait lines with a toggle or a slip knot which holds the bait on the outside of the neck, so that the lobster has to enter the pot to get at it.

Several fishermen on Anglesey use a cubical pot of wire netting on a wooden frame with one or two funnels of wire netting leading in from the top. These pots are heavily weighted with bricks or stones and are very cumbersome, though said to catch well (Plate 3(b)).

(b) *The Scottish Creel*

These cottage-shaped pots which are by far the commonest pot in Scotland and on the north-east coast of England have been very little used in Wales in the past, though they have been introduced to Mochras, Abersoch and Bardsey Island in the last few years. A few fishermen in mid-Wales, especially Aberystwyth, have also used this shape of pot (Plate 3(c)) but incorporating the 'blind' or 'soft' funnel which characterises the barrel-shaped pots of South Wales described later. At Llandudno and Conway there has been developed a pot which is basically a Scottish creel, but is much larger. Those used from Llandudno are shown in Plate 4(a), the base being 33 × 22 inches and height 25 inches, compared with 26 × 20 inches and a height of 14 inches for the typical Scottish creel.

A further variant of the cottage shape is a heavy pot used by one man at Porthdinlleyn which is made of $\frac{1}{2}$ inch wire-netting on a metal frame and has an entrance at one end. The entrance is fitted with a wire non-return valve. These pots are heavily tarred, have been used for some ten years and are still in excellent condition.

(c) *Barrel-shaped Pots*

There are two forms of this type of pot, which is considered to be of French origin. The form of pot most closely resembling that used by French boats is a cylinder of wooden laths held in position by wooden hoops and is fished lying on its side, held down with stones attached to the outside, halfway down the cylinder. The ends are closed with laths or with netting. The opening is a rather large one of wood halfway along the barrel and opposite the weights, so that the opening is on the top while the pot is fishing (Plate 4(b)).

The wooden, barrel-shaped pot is not widely used and is structurally rather weak for working inshore. The French use these pots largely in deeper, offshore water, when fishing for crawfish (*Palinurus vulgaris*).

A variant which is fairly widely used on the south coast of Wales, and particularly from Milford Haven, is shown in Plates 4(c) and 4(d); it is made of tarred netting on a frame of three galvanised iron rings of 16 inches diameter, held apart by wooden bars, giving a total length of 20 inches. These small pots are weighted by stones attached on the outside. Each opening is a short funnel of netting, and instead of the inner end of the funnel being held open the base of the funnel is kept taut by strings to the far side of the pot, while the top of the funnel is left unsupported and therefore falls down to close the opening. The pots can thus be entered from the outside without difficulty, but it is virtually impossible for a spiny creature to get out. There is one of these eyes on each side of the pot, diagonally opposite each other.

These pots have a great retaining capacity, but tend to catch chiefly the smaller lobsters, the entrances being too small for the larger lobsters.

The South Wales pots are opened for baiting and emptying at each end, the end being made by the twine netting forming, and continuing from the barrel, being drawn together by a cord threaded through the meshes. The bait line runs vertically in the centre of the pot. It is this 'soft' or 'blind' eye that is incorporated in some of the creel-shaped pots already described. One fisherman has produced a Cornish-shaped pot of wire and twine in which two blind eyes are incorporated, entering from the sides of the pots, while the normal funnel on the top is replaced by a door for baiting and emptying the pots.

3. FISHING METHODS

At present the Welsh fishermen pay much more attention to lobsters than to crabs than appears to have been the case in the past, or than applies at present in other parts of England or Wales.

Although crabs are caught, particularly in the south where they are sent to Milford Haven market, there is practically no attempt made to catch large quantities, and unless the crabs are of very good size and condition they are often thrown back. During the summer the few crabs that are brought ashore in Mid and North Wales are sold locally. Crawfish are not sought after at all. That they are landed in such small quantities now compared with 30 years ago (see Table 5) is probably due to the fact that in the south, where they are most common, the pots are now typically very small-eyed and therefore cannot catch the large crawfish, combined with the fact that fishing is confined so much to the coastal water under 5 fathoms deep.

The number of pots fished together is very different in different parts of Wales. North of Barmouth, the majority of pots are fished singly or in strings of two, three, or four pots on a line. All the smaller boats fish the pots singly, placing each pot carefully at a position known to be frequented by lobsters. Even the larger boats do not have strings of more than 4 pots together. Off most of North Wales, with the exception of round Bardsey Island and the north coasts of Anglesey, the rough ground is patchy and there is little doubt that, for lobsters, it is a sounder policy to take care and get all the pots on good lobster ground than to work faster dropping longer strings of pots with the likelihood of getting half the pots on rough ground and half on sand or mud where the main catch is whelks. Around Bardsey Island or along the whole of the north coast and north-west coasts of Anglesey, where the rough ground is much more nearly continuous, it would seem worth while to try strings of ten or more pots together.

From Barmouth southwards, the use of single pots is largely restricted to the boats fishing less than 15 pots and to the boats working in the Milford Haven area. The majority of the other boats work strings of 5, 10 or 15 pots at intervals of between 5 and 10 fathoms on a backrope. Typically the strings of pots are marked by floats at one end of the string only, but some fishermen have a buoy line at each end. The buoys or floats usually comprise a few corks on the buoy line and one or two trawl floats, but these are sometimes supplemented or replaced by a flag on a bamboo or other stick, stuck through a group of cork floats and weighted.

The majority of fishermen go round their pots once per day but a few visit some or all a second time while two or three boats go round their pots three or more times a day when weather permits. It is interesting to note that one successful fishermen considers that he gets his best catches by going rapidly round his pots at dawn as soon as the floats are visible, returning later in the day to go round again and change the bait at greater leisure.

Those who fish their pots more than once a day favour large-eyed pots, about 7 to 8 inches diameter, while those who go round once a day typically use pots with smaller eyes of $4\frac{3}{4}$ to $5\frac{1}{2}$ inches diameter, or with the 'blind eyes' already described.

As the smaller lobster boats can only work inshore near their home ports, their season is kept short by winter storms, and most of these boats are only fishing for the five months from May to September inclusive. The larger boats typically begin in April or May and go on to the end of October or into November with a few continuing into December, depending on how the gear has stood up to autumn gales, making a maximum season of eight months.

Most of the lobster fishermen go to other work ashore for the winter months, preparing their boats and gear for the following season during their spare time. Some, and particularly those owning the larger boats and fishing into November and December, do not take other employment.

4. BAIT

As mentioned earlier, and shown in the appendix, the vast majority of the regular lobster fishermen use salted gurnard as bait. No gurnards are caught by the fishermen themselves, the gurnards for Central and South Wales being bought from Milford Haven and those for the north from Fleetwood.

The price of the bait, which is a major item of expenditure, varies considerably, but for the fishermen round Milford Haven, who buy it direct from the market, the price during the lobster seasons in 1954 and 1955 varied between 3/0d. and 5/0d. per stone, occasionally rising to 7/0d. or more, especially when French boats were visiting Milford Haven to stock up with bait and other requirements. At the ports further from Milford Haven the gurnards for bait cost more, due to transport charges, and 6/0d. per stone was the normal price at Fishguard and 7/0d. to 8/0d. at Newquay and Aberystwyth. 7/0d. to 8/0d. per stone was also the typical price being paid by fishermen in the ports of North Wales, from Barmouth to Holyhead, for gurnards from Fleetwood.

In 1954 the White Fish Authority arranged for gurnards from the Milford Haven market to be quick-frozen as a source of supply to lobster fishermen. These cost 4/6d. to 5/0d. ex store in 1954 and 5/6d. in 1955, and, being found little different in quality for bait from those received fresh, were much appreciated by the lobster fishermen when the fresh were in short supply.

In 1956, in addition to the supply of frozen gurnards, a scheme was being developed by a merchant at Aberystwyth by which he both bought the catches of lobsters from the fishermen and supplied bait. The gurnards from this merchant were available to lobster fishermen between Barmouth and Newquay at prices below those normally paid for lobster bait brought by rail from Milford Haven. Round the Lleyn peninsula and on Anglesey away from Holyhead, both areas where rail transport is not available, a considerable proportion of fishermen catch their own bait, using trammel nets, long-lines and trawls. Dogfish is particularly commonly used in these cases, though any fish caught may be used.

When rabbits were abundant, before 1954, rabbit flesh was considered good bait and was quite extensively used on the Lleyn peninsula by men whose main occupation in winter was rabbit catching.

A few fishermen supplement their normal bait with fish heads and 'frames' (skeletons) obtained from fish shops, and in one or two cases little else is used.

5. STORAGE OF LOBSTERS

At present most lobster fishermen tie the claws of the lobsters with string or keep them closed with elastic bands or rubber bands made from old bicycle inner tubes. The lobsters are then stored in wooden or metal crates, called keep pots or trunks, capable of holding 40 to 100 lobsters each. In sheltered areas, but not in estuaries with fresh water entering, the crates are kept floating with the top just awash, but in other areas where there is fresh water entering the sea or where the coast is very exposed, the keep pots or trunks are made of metal or weighted so that they lie on the sea-bed away from the wave action and the fresh water.

The keep pots are typically emptied twice a week, when the lobsters are sent away to market.

At present no attempt is made on the Welsh coast to hold lobsters in ponds from the summer into the winter or in order to accumulate the catch from several weeks' lobster fishing, as is practised in some other parts of Britain (Thomas, 1958).

6. MARKETING

In all parts of Wales a considerable proportion of the catch, especially from men with few pots, is sold locally at prices which in 1954 and 1955 varied between 2/6d. and 4/6d. per lb. However, most full-time fishermen send the majority of their lobsters to one of the larger markets. In general, lobsters at or below 2 lb in weight are in greatest demand and fetch a higher price per lb than those above 2 lb. Also the price is at its minimum in summer, rising in winter to a maximum which is frequently about double the summer price.

In South Wales, from Tenby to Fishguard, the majority of lobsters that are not sold locally are sent to the Milford Haven market, where in 1954, the following average monthly prices held, per lb:

May	June	July	August	September	October
3/6d.	3/0d.	3/1d.	3/3d.	2/5d.	3/0d.

A few were sent direct to Billingsgate (London), Cardiff and Swansea.

From Newquay to Barmouth the majority of those not sold locally were sent to Billingsgate, with a few to Birmingham. However, since 1955, a merchant in Aberystwyth has been buying lobsters from a number of fishermen from this stretch of coast for dispatch to local and inland markets. He has been collecting the lobsters unpacked and has also been selling bait, as already mentioned. This development has been widely welcomed.

In the north, from Criccieth to Llandudno, apart from those sold locally, a considerable number were taken by merchants in Deganwy and Llandudno who sent vans to collect them from as far afield as Aberdaron. The rest, probably a third, were sent direct to market at Liverpool with a few to Billingsgate.

Summer prices at the inland markets in 1954 varied between 3/0d. and 4/0d., being most often about 3/6d. per lb (£19 11s. 0d. per cwt). Transport charges by rail to London from central and north Wales amounted to between 15/0d. and 18/0d. per cwt (gross) and 10/0d. and 13/6d. to Birmingham.

IV. THE POTENTIALITIES OF LOBSTER FISHING ON THE COAST OF WALES

In this preliminary study of the potentialities of the Welsh coast for lobster fishing two aspects have been examined. The first is the distribution of rough ground as a suitable habitat for lobsters, compared with that of the well-known lobster areas of the north-east coast and of the south-west coast of England; the second is an examination of the catches of the present lobster fishermen.

1. A COMPARISON WITH THE COASTS OF NORTH-EAST ENGLAND AND OF DEVON AND CORNWALL

So little is known about the quantitative distribution of the lobster on the Welsh coast that it has been considered worthwhile to make an approach to the potentialities of the area through an examination of the distribution of suitable habitats. It is well-known that while lobsters at times can be caught in the trawl and in pots on sandy bottoms, the main habitat is one where rocks and stones and possibly attached algae, when present, provide shelter. Although all rough ground will not provide equally good shelter and other factors no doubt will partly govern the numbers of lobsters on rough ground within the overall temperature limits of the species, the presence of rough ground is one minimum requirement for a thriving lobster population.

The only comprehensive data on the nature of the bottom round the coast of England and Wales are the observations made during the surveys for the preparation of Admiralty charts. As the observations were made by the use of the sounding lead armed with tallow they are mainly spot observations at intervals of several hundred yards. However by using charts of the same scale on which the record of bottom type are given at approximately the same frequency per unit area of bottom, it is possible to produce a picture that allows comparison between the three areas which it is desired to compare.

In Fig. 1 the records of rock as indicated by 'R' or 'r' on Admiralty charts of scales 1/145,000 to 1/147,000 are shown by dots. On this chart it is seen that the lobster and crab

Fig. 1. *Map of England and Wales showing the distribution of rocky bottom as given by the markings R or r on Admiralty charts of scales* $\frac{1}{145{,}000}$ *to* $\frac{1}{147{,}000}$.

areas of the north-east coast between Flamborough Head and the Scottish border and the coasts of Devon and Cornwall include many records of rocky ground. It may also be noted that along the coast from Flamborough Head to the river Tees there is less rough ground marked than north of the Tees, except right inshore, although the landings of lobsters in the more southern area are comparable to those of the coast of Northumberland and Durham. It is probably relevant that stony ground is considerably more common off the Yorkshire coast (marked as 'st' on the Admiralty charts) than further north, and that lobsters may also be present on ground which is not really rocky but where there is sufficient hard bottom to give enough cover or support for algae to provide protection during moulting.

Fig. 1 also shows a number of records of rocky ground along the south coast of England, east of Devon, and in fact there is a considerable fishery for lobsters all along this coast.

There is some lobster fishing on the east coast of England between Flamborough Head and the river Thames although there is no indication of rock on Admiralty charts. Most of these lobsters are caught at Cromer and Sheringham incidental to a large crab fishery. The lobsters landed are chiefly small and catches include a large proportion of under-sized animals (Graham 1949). The small mean size of the lobsters caught here may be due to some extent to the use of pots designed to retain small crabs which are, therefore, much more efficient at retaining small lobsters than the pots used on any other part of the coast. Another factor operating in this area which could also result in few large lobsters being present is the lack of rough ground and therefore lack of cover for moulting lobsters, with a resulting high natural mortality.

There is no indication of rocky ground on the north-west coast of England, between the Welsh and Scottish borders, and there is virtually no lobster fishery there.

Turning to the Welsh coast and comparing it with the north-east coast, the Welsh coast has not such a continuous band of rough ground, though the main rough grounds of the Welsh coast are comparable in width and depth of water to similar lengths of coast off Northumberland. In the south-west of Wales the rough ground extends further to sea than at any point on the north-east coast of England. The total length of coast-line with some rough ground in Wales is considerably longer than that of the north-east coast from Flamborough Head to the Scottish border, but the total area of rough ground off Wales appears less, but not a great deal less than that in the north-east.

Comparing the Welsh coast with the coasts of Devon and Cornwall there are more similarities, the width of the rough ground is more variable in both areas and both have the extension of rough ground at their south-west extremities which is upstream so far as residual currents are concerned. It may be expected, therefore, that these areas will provide a reserve of stock which will release into the sea their pelagic larvae which will tend to be distributed along the coasts of the two areas. The length of the rocky coastline of Devon and Cornwall is similar to that of Wales but the total area of rough ground is more in the former, though again not a great deal; it certainly is not as much as double that of Wales.

By this somewhat superficial method the total extent of ground off the Welsh coast suitable for lobsters and crabs appears to be a little less than that of either of the other two areas, probably between a half and three-quarters of either of them. The potentialities of the whole Welsh coast for lobsters may therefore be expected to be only a little less than that of the other areas. The areas such as the north coast of Anglesey, the west and north-west coasts of the Lleyn peninsula and much of the Pembrokeshire coast, where the rocky ground is most extensive, may be expected to carry lobster and crab populations comparable with those on the roughest grounds in the north-east and south-west of England.

2. THE PRESENT AND POTENTIAL YIELDS

It is well established that lobsters migrate very little, and therefore in considering the potentialities of the Welsh coast for lobster fishing, and the extent to which these potentialities are being realised, it is necessary to consider the different parts of the coast separately

Table 5: *Numbers of pots used and estimated landings of lobsters by areas along the Welsh Coast*

Area with approximate length of coastline	*Approximate number of pots used*			*Average weight of lobsters landed (lb)*	*Estimated annual yield of all men fishing over 15 pots*			
	Full-time fishermen	*Part-time using > 15 pots each*	*Part-time using < 15 pots each*		*No.*	*Cwt*	*numbers per pot fished*	*cwt per 100 pots fished*
Llandudno – Rhosneigr (48 miles)	200	250	180	1¾	18,500	288	41	64
Trevor – Rhiw (25 miles)	200	170	120	?	13,000	–	35	–
Porth Neigwl – Criccieth (17 miles)	350	210	50	1¼	26,300	294	47	52
Mochras Point – Aberystwyth (32 miles)	300	150	50	?	26,300	–	58	–
Aberayron – Strumble Hd. (43 miles)	450	50	140	1½	26,700	358	53	72
Strumble Hd. – St. Brides Bay (22 miles)	280	330	100	1¾	27,700	432	45	71
St. Brides Bay – Tenby (36 miles)	210	40	40	?	11,500	–	46	–
Tenby – Swansea (40 miles)	–	–	50	?	–	–	–	–
TOTALS	1,990	1,208	730		150,000			

and in some detail. To facilitate this examination the coastline has been divided into eight sections on the basis of the topography.

During the present survey length-composition data of the commercial catches were obtained from five localities on the coast, but, as the numbers of observations are few and only in a few cases was it possible to get the sexes separately, it has not been possible to use them for numerical estimates of total mortalities in the different areas as intended, and as done by Thomas (1951, 1955) for the Eyemouth area in his studies of the Scottish lobster fisheries. The length-composition data, which are given in Fig. 4, do, however, show important differences in different areas which are discussed in relation to the other observations from each area. The different types of pots used will have affected the relative numbers of the largest and smallest lobsters in the commercial catches, but it is probable that over the central range of lobster sizes, between 10 inches and 14 inches, the catches will not have been much affected by pot selection.

The published statistics of landings of lobsters in England and Wales are unfortunately far from complete, largely owing to the fact that lobsters are landed at many small ports where no regular collectors of statistics are stationed. This is particularly true of the Welsh coast. There are, however, complete figures of the quantities of lobsters sold through the fish market at Milford Haven.

During the present survey no attempt has been made to obtain full information on annual catches of all fishermen, but from those statistics that are available, from the co-operation of a number of fishermen who have made their catch data available to me, and from general conversation, an estimate has been made of the yields of each area.

The catch per boat varies very greatly, even among full-time fishermen. Some of the less efficient and typically smaller boats, hand hauling single pots, catch over the season May to September inclusive, a little over 1,000 lobsters over 9 inches long. The larger boats, working 70 to 80 pots in strings of 4 to 15, and in some cases hauling more than once a day, reach 5,000 without difficulty. The catches of the three or four top boats are in the region of 8,000. These figures include berried females, which over the year comprise between 5% and 20% of the catch.

Table 5 summarises the number of pots used along the Welsh coast and gives an estimate of the yields from the seven areas. The figures of total yields, and of yields per hundred pots, of fishermen working more than 15 pots must be considered in relation to all the factors involved or they can be very misleading. The different areas will be considered in turn from the north southward, the lengths of coastline given in the headings of each section being measured without taking into account the smaller bays and inlets. Fig. 2 shows the places referred to in the text and Fig. 3 shows the distribution of rough ground along the Welsh coast from Admiralty charts and local information, and the approximate number of pots being worked in the different areas.

LLANDUDNO—RHOSNEIGR (48 MILES)

This northernmost area includes one of the most extensive rough areas on the Welsh coast. From Cymyran to Holyhead Harbour and from Church Bay to Dulas the rough ground extends from 2 to 4½ miles from the coast. Nearly all this rough ground is within the 20 fathom line, though west of Holyhead it extends down to 25 fathoms and there are some fairly extensive areas of rough ground in 23 to 25 fathoms north of the Skerries. Coastal rough ground is present most of the way from Rhosneigr to Puffin Island and round the Great Orme and the Little Orme.

In spite of this being the longest of the eight coastal strips, and including so much rough ground, there are only eight men using four boats fishing full-time for lobsters. There are, however, about twelve boats being used part-time and working up to 25 pots each, with a further number of rowing boats fishing less than 15 pots each. In some parts there remains a strong tradition that the fishermen from each port have their own limited fishing ground and do not work the grounds of the fishermen from the next port along the coast. This tradition is linked to a fishery where all the pots are worked within a few hundred yards of the cliffs.

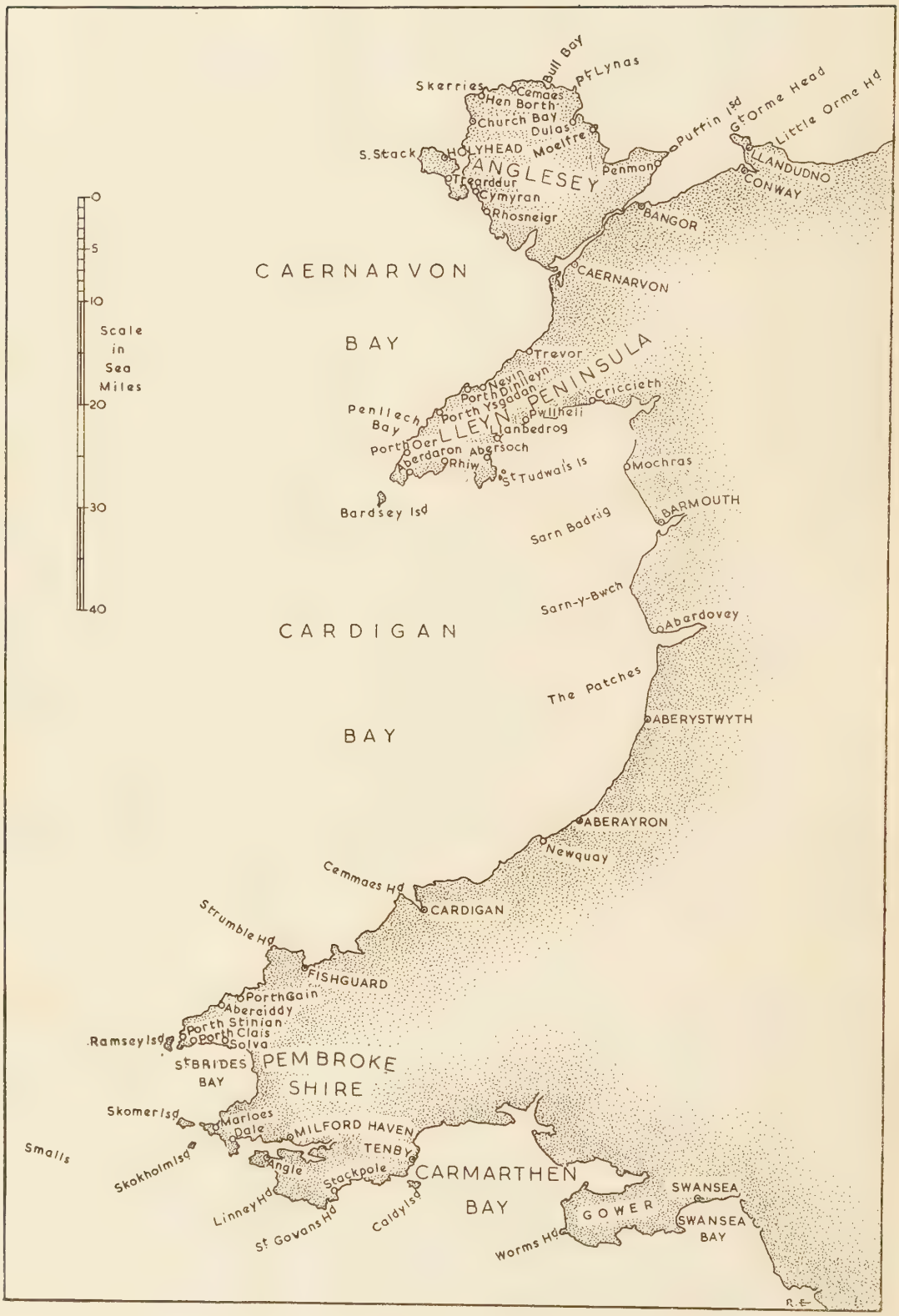


Fig. 2. *The coast of Wales showing the places referred to in the text.*

(a): Ships' lifeboats converted for lobster fishing, Abereiddy.

(b): Two Cornish luggers and a converted ship's lifeboat (AB5) used for lobster fishing, Newquay.

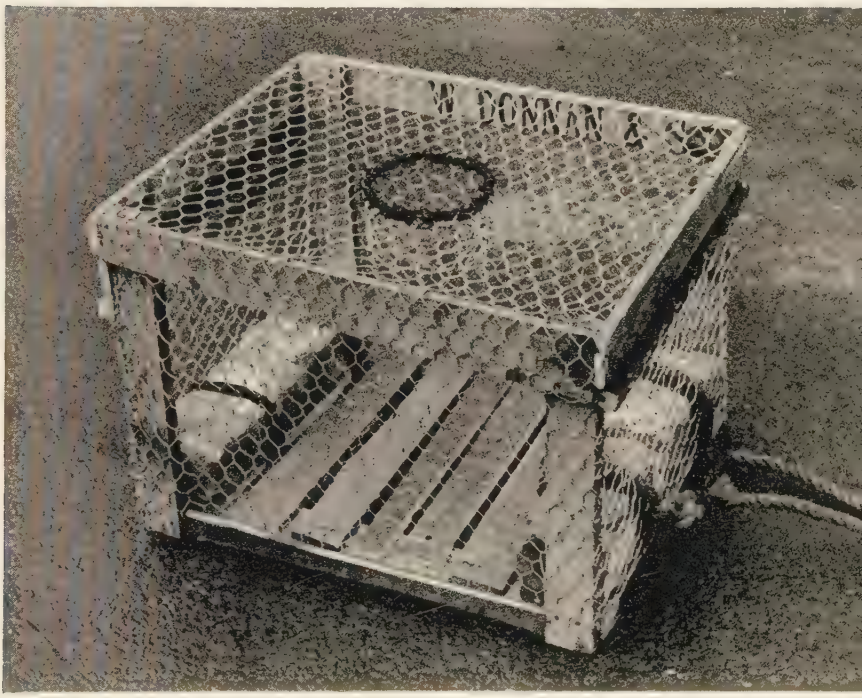
PLATE 1

(a): Ink-well type pots made of willow at Porth Clais being used in Ramsey Sound.

(b): Arrangement aboard a 24 foot boat for working pots single-handed. Ramsey Island.

(c): Spherical pots at Porth Meudwy, Aberdaron.

(a): Ink-well type pots of wire and twine, weighted with cement. Aberayron.



(b): Cubical pot of wood and wire netting, weighted with bricks. Holyhead.

(c): Creel-shaped pots with 'soft' non-escape entrances. Aberystwyth.

PLATE 3

(a): A large creel weighted with slabs of slate. Llandudno.

(b): Barrel-shaped pots, West Angle, Milford Haven. (Photo by P. J. Warren)

(c): Cylindrical pot with 'soft' non-escape entrances. Angle, Milford Haven.

(d): As in (4c) with a lobster being removed. Details of the entrances can be seen on the right-hand side of the pot.

PLATE 4

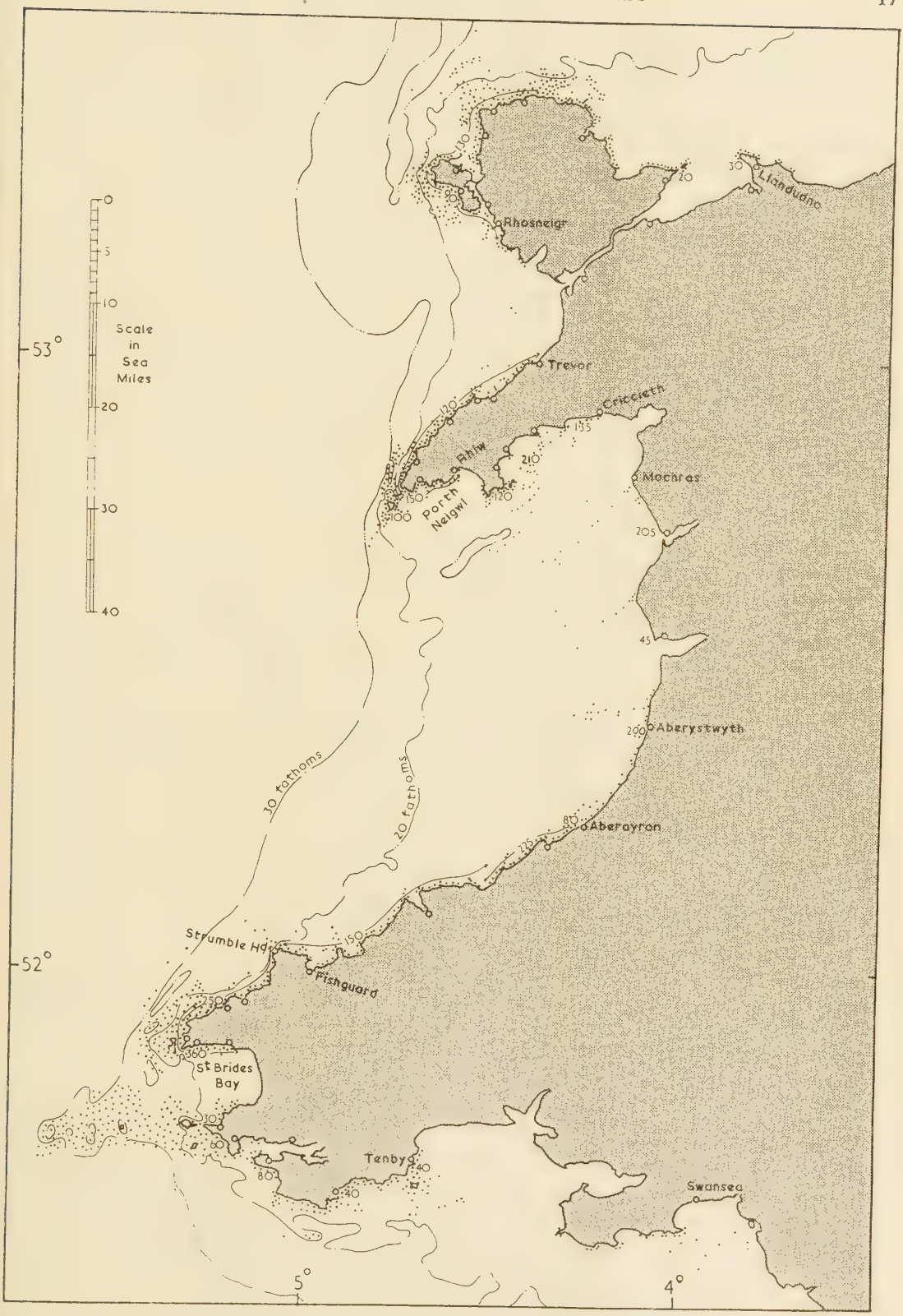


Fig. 3. *The coast of Wales showing the distribution of rough ground and the approximate numbers of lobster pots being fished in* 1954 *and* 1955.

The yield of 290 cwt lobsters for the area is low for the length of rugged coast compared with the recorded landings of 830 cwt for the 48 miles north of River Tees on the north-east coast of England, or the 635 cwt for 48 miles of coastline east of Land's End in 1954 (from an unpublished census). The annual catch per 100 pots being fished is 64 cwt, an intermediate value for the Welsh coast, but much greater than the comparable figures of about 24 cwt for the above north-east coast area and 18 cwt for the Land's End area. At Holyhead the modal length of lobsters caught was the 10 to 11 inch class and at Puffin Island the 11 to 12 inch class, and the mean weight of lobsters over 9 inches at Holyhead was $1\frac{3}{4}$ lb.

These figures all suggest that the area as a whole is lightly fished, although the inshore strip may be locally depleted at times.

Round Holyhead Island and the north coast of Anglesey the tides are strong, reaching 5 knots in some places at spring tides, and it cannot be an easy area to fish. While the south-west coast of Holyhead Island is exposed to the storms from this quarter, and there are no non-tidal harbours there, the north coast of Anglesey gets shelter from the worst storms and there is the very fine Holyhead harbour, well lit, and accessible at all times. There is also good rail communication with the Midlands and London.

These would therefore seem to be the conditions in this area for a considerable expansion of the fishing, especially from Holyhead, not only with boats of the present size range up to 35 feet, but also with larger boats using heavier gear and fishing further offshore.

TREVOR—RHIW (25 MILES)

This coastline is rugged throughout its length. Between Trevor and Porthdinlleyn the rough ground is patchy with sandy areas, but the rough ground extends a mile and a half or more to sea in places. South of Porthdinlleyn the rough ground along the coast is narrow but nearly continuous, widening to a mile or more just south of Penllech Bay and becoming very extensive north and south-west of Bardsey Island, linking with the mainland across Bardsey Sound, and continuing along the coast to Rhiw. A feature of the sea bottom all round the Lleyn peninsula is the large area marked as stones on Admiralty charts and which is too rough for trawling. Off Pwllheli much of this ground carries lobsters and it is to be expected that lobsters will be present on most of the stony ground round the peninsula.

At present the fishing between Trevor and Rhiw is wholely conducted by small boats, only two of which exceed 15 feet; these are 17 feet and 21 feet respectively. Practically all are open boats and many have no engine or only outboard motors.

The yields per boat are relatively low. This is probably due to the small size of each unit which limits their range, nor can they work so many pots or work in bad weather. The reason for the absence of larger boats in this area is undoubtedly the virtual absence of harbours. Between Porthdinlleyn and Pwllheli there is no harbour where a boat can lie at anchor safely in all weathers. All the boats in this area are pulled out of the water during the winter and most of them are beached every day during the fishing season.

The view has been expressed by fishermen in this area, both at Aberdaron and Porthdinlleyn, that the lobsters at times are scarce and that the ground is over-fished; however, the extent of the rough ground, and the fact that most of the small boats tend to keep largely to the grounds close inshore, suggests that any apparent over-fishing is almost certainly due to the concentration on a local inshore strip when there are unexploited areas nearby, a little offshore, which if fished in rotation would give a steady higher yield.

While there is no doubt that this area, especially between Rhiw and Penllech Bay, carries a lightly exploited stock there is little likelihood of much development while there is no safe harbourage available. The one inlet which could probably be developed to serve this area is the small inlet of Port Meudwy, or Fishermen's Cove, from which the Aberdaron men work and from which boats ply to Bardsey Island. A breakwater from the western side of this bay would provide safe anchorage and would be a great advantage for the development of the fishery.

PORTH NEIGWL—CRICCIETH (17 MILES)

In this area the only rocky coastlines are between Porth Neigwl and Abersoch including the rugged Cylan and Wylfa headlands and round the St. Tudwal's Islands. However, west

of a line running south-west from Criccieth, there are numerous patches of rocks and stones some of which are in the form of ridges standing about 2 fathoms above the surrounding sandy bottom and are probably moraines.

There is a long-standing fishery for lobsters round the rocky areas mentioned above, and Llanbedrog Head, but in the last five years, largely through the initiative of one fisherman

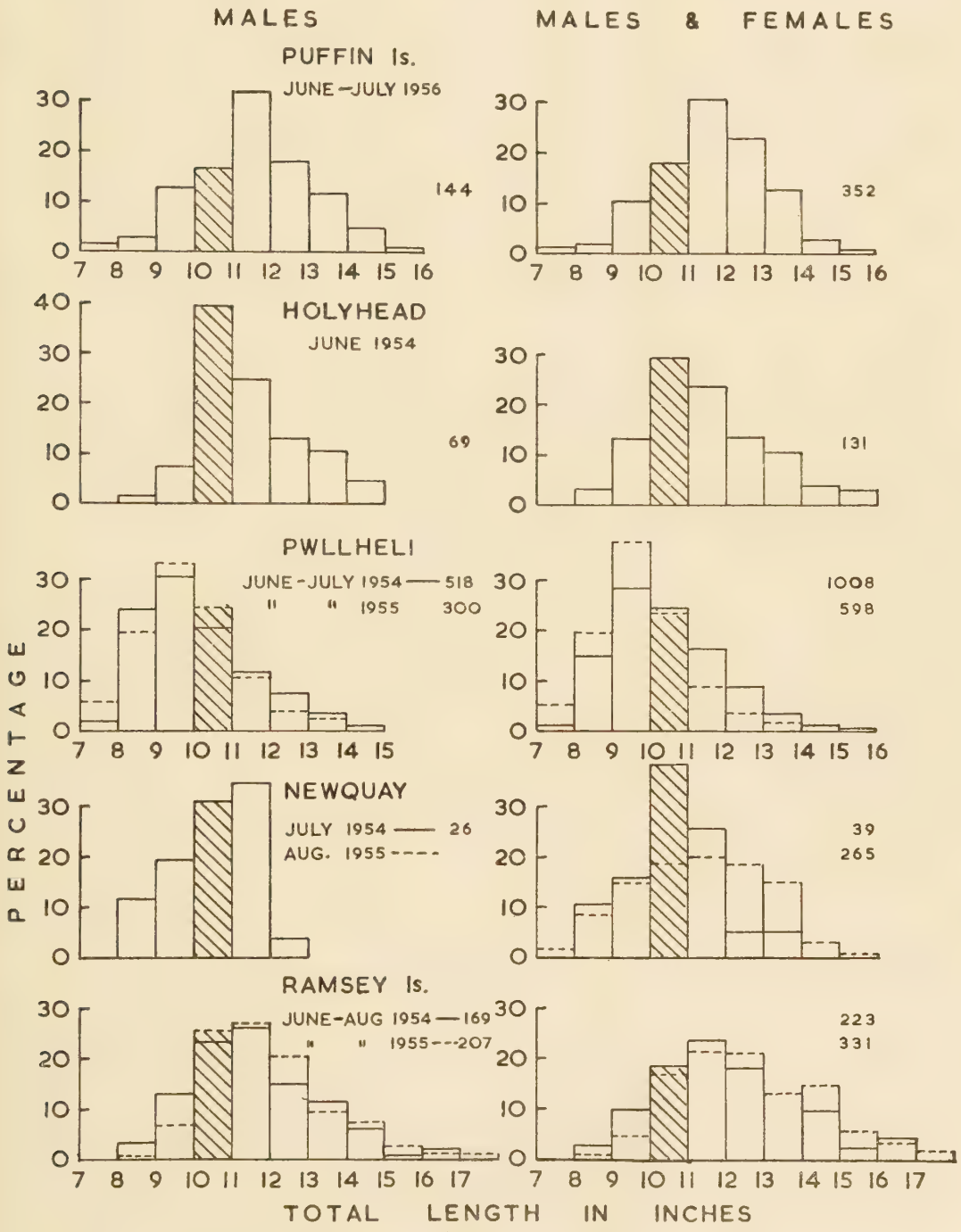


Fig. 4. *Percentage length-composition of catches of lobsters at five localities.*
(The measurements refer to the total length of the lobsters, measured on their backs)

who previously knew the area well from trawling, the lobster fishing has been extended out to some four miles from the shore, and increased to many times its previous intensity.

The presence of Pwllheli as a safe harbour, though tidal, and the possibility of working larger boats from Abersoch and Llanbedrog during the summer, has resulted in this fishery now including five boats of 33 feet and over, although two of these are not full-time on lobster fishing.

During the recent development of this fishery the total yield has greatly increased with more boats working the area, but the yield per boat and the average size of the lobsters caught has decreased. While this area is smaller than either of the previous areas the number of pots being fished is considerably more (Table 5). The yield in numbers per mile of coastline is higher than any other area. However, due to the smaller size of the lobsters caught and the large numbers of pots, the yield by weight per hundred pots fished is the lowest of any area. The mean weight of lobsters landed in this area is about $1\frac{1}{4}$ lb compared with about $1\frac{3}{4}$ lb in the two previous areas. (Estimated from length-composition data.)

The size-composition of the catch in the area between Pen-y-Chain Pt. and St. Tudwal's Islands in 1955 is shown in Fig. 4, and it is seen that this is the only area in which the 9 inch lobsters were the most abundant size group.

The commonly used pot in this area is the small Cornish type pot made of cane, with a $4\frac{3}{4}$ inch opening, and, although the small opening of this pot will have increased the proportion of small lobsters retained and reduced that of the largest ones captured, experimental fishing in the area with a variety of pots, including Cornish type cane pots with a $5\frac{3}{4}$ inch entrance, all showed the 9 inch group to be the most abundant.

It is probable that the stock in this area has not yet reached equilibrium with the increased fishing and a slight further drop in yield per boat may be expected after 1956. As the number of pots fishing the area has remained about stable since 1954 it may be expected that equilibrium will shortly be reached and maintained. There is little doubt that the area between the St. Tudwal's Islands and Pen-y-Chain Pt. is more heavily fished, for the size of stock it carries, than any other area on the Welsh coast.

MOCHRAS—ABERYSTWYTH (32 MILES*)

Round Portmadoc the sea-bed is sandy, there is no lobster fishing in the vicinity and there is little likelihood of many lobsters being caught near the port. A few pots have been brought to the port in recent years but no serious attempt at fishing has been made in 1954 and 1955. The usual troubles of a tidal harbour, with greater distance from good lobster grounds than most, make it less suitable for boats with low speeds.

From Mochras Pt. to south of Aberystwyth the rocky coastline is intersected by sandy stretches and the rocky coastal strip is typically narrow. However, in the area there are a series of extensive rocky and stony patches including Sarn Badrig (St. Patrick's Causeway) Sarn-y-Bwch and the Cynfelin Patches which extend 4–10 miles to sea, and also have extensive rough patches at their shoreward ends.

During 1955 two boats which had come north to work in this area during the lobster season were very successful. One, working from Barmouth came from Milford Haven, and the other, working from Aberystwyth came from Fishguard. In addition a local boat has started from Barmouth and these three boats, fishing very intensively, account for well over 75% of the catch from this 32 mile stretch of coastline.

There are a number of boats registered at Aberystwyth which are only fishing part of the season and then not continuously. The business of taking out summer holiday visitors is a paying proposition and the partial or complete turning to this activity and some mackerel fishing during the holiday season has kept the fishing effort of these boats considerably below that indicated by the number of pots they work when not taking out visitors (Appendix 1). The catches of the full-time fishermen at Aberystwyth are good and there is no report of their decline. The tides in this area, as in the two adjacent ones, are never strong and even light gear is rarely pulled under. In this area, more than any other, the pots are lifted two or more times per day.

*Mochras Pt. to halfway between Aberystwyth and Aberayron.

The total yield is among the highest along the coast and in spite of a third of the pots being fished by part-time fishermen, the catch of 53 lobsters per pot fished was also high. While unfortunately there is no information on length-composition of the catches to supplement the catch and effort data, it would appear that there is no shortage of lobsters in the area. It is here, beyond the three mile limit, that French boats, fishing primarily for crawfish but also catching large numbers of lobsters, are seen from time to time. These boats occasionally call at Newquay and Aberystwyth for provisions or when sheltering from bad weather. A description of these well boats and their barrel-shaped pots is given by Fish (1953). The fact that these French boats, which range the west coast of the British Isles, do visit and fish this area indicates that there is a considerable quantity of lobsters and/or crawfish in the offshore waters, presumably on the patches of rough ground such as occur at the end of three causeways.

One of the chief problems of this central area of Wales has been the transport of bait to the fishermen, and of lobsters to market. However, as mentioned above, this problem has now largely been solved by the initiative of a local merchant.

The other major problem is that all three ports are tidal, and only Aberystwyth harbour entrance is lit at night. While these are hindrances they need not prevent efficient boats of 30 feet or more with shallow draught working the area.

ABERAYRON—STRUMBLE HEAD (43 MILES*)

Between Aberayron and Strumble Head there has also been a considerable increase in the intensity of lobster fishing since the last war and on this stretch of coast there are five good boats of 27 feet to 36 feet, working 75–120 pots each from April to October and occasionally to November or December.

During the winter the younger men work ashore or on the Fishguard boats to Eire.

Much of the fishing in this area is done within half a mile of the shore. Although north of Cemmaes Head this is largely necessitated by the virtual lack of rough ground further offshore, south of Cemmaes Head good grounds exist up to a mile or more offshore. Off Dinas Head and Strumble Head rough ground extends two or three miles offshore, though off Strumble Head the outer rough ground is in water of 25 fathoms.

This area gave a mean catch of 71 cwt per hundred pots, but this high value is partly due to the virtual absence of the smaller boats fishing 20 to 50 pots. The two samples of the size-composition, taken from catches near Newquay, when the fishing was relatively heavy, show at least the 10–11 inch length class to be more abundant in the catches than the 9–10 class. The mean weight of lobsters landed at Newquay is $1\frac{1}{2}$ lb, which suggests a heavier exploitation than in the Holyhead area or between Fishguard and Milford Haven, but the size-composition and yield per hundred pots fished show that the stock is not being unduly depleted. The narrowness of the rough ground and the lack of rough patches further offshore, except in the south, indicate, however, that this area is unlikely to be able to support, mile for mile, as much fishing as the areas already described, or the next area to the south.

STRUMBLE HEAD—ST. BRIDES BAY (22 MILES)

In this area rough ground extends one to three miles from the coast at most points and there are outliers of rough ground up to five miles offshore in 25 to 35 fathoms of water.

About three-quarters of the rough ground is in less than 20 fathoms water and a quarter lies between 20 and 35 fathoms. Between Porth Gain and Strumble Head the rough ground is more patchy offshore than south of Porth Gain where it is virtually continuous.

On this very exposed coastline there are several small ports which give safe anchorage but which are inaccessible in bad weather, and all of which are tidal, i.e. Porth Gain, Porth Clais and Solva.

There are only four full-time boats, with about eleven part-timers and a number of small boats fishing less than a dozen pots each. The full-time 28 foot boat from Solva is the

*Strumble Head to halfway between Aberayron and Aberystwyth.

only one on the coast with a crew of three (father and two sons), it ranges widely over the area extending from both sides of St. Brides Bay to Newquay, and fishes in water down to 30 fathoms.

There is no doubt that this is a difficult area to fish, owing to strong tides which carry the floats of light gear below the surface for most of the tidal cycle, and lack of good harbourage and shelter.

The catches in this area are, however, high and include many large lobsters, as seen in the length data of catches from Porth Clais (Fig. 4). The almost equal numbers of lobsters of 10, 11, and 12 inches in the total catch and the fact that among males the 12 inch lobsters were more than 50% of the 10 inch lobsters show conclusively that the stock here is not heavily fished.

With the exception of the one boat from Solva there is very little fishing on the offshore grounds and none in winter beyond 20 fathoms. There is no doubt that this area could support much greater fishing, and any move to improve the harbours, where this is practicable, such as at Porth Clais, and to provide lights, lacking at present at all ports, would assist in its development. However, it is unlikely that the larger boats of 30 to 45 feet needed to fish the offshore grounds could regularly use any of these ports and they would have to work from Fishguard or Milford Haven—16 to 20 miles away by sea. Such boats would do better if prepared to stay out all night. Fortunately Ramsey Sound can give good anchorage and temporary protection from all directions although the tidal currents in the Sound are very strong, reaching 6 knots during springs.

Transport is a problem, since the nearest railway stations are at Milford Haven and Fishguard. At present individual fishermen take their catches by road to local buyers or sell to a Milford Haven merchant who calls at the coastal ports as far north as Fishguard.

ST. BRIDES BAY—TENBY (36 MILES)

This coast is characterised by its ruggedness and exposure to the south-west, receiving the full force of the Atlantic rollers. From Tenby to Milford Haven rough ground extends all along the coast, being broken only by a few sandy bays. Round Caldy Island rough ground extends in patches to four miles from the coast, and between here and the mouth of Milford Haven patches of rough ground up to a mile or more from the coast are common. A military training ground between Linney Head and St. Govan's Head severely limits fishing in this area. Within Milford Haven itself there is extensive rough ground which is fished when it is too rough to go outside. From the mouth of the haven westward lies the most extensive area of continuous rough ground off the Welsh coast. From the coast out to Skokholm and Skomer Islands the rough ground covers about 20 square miles and is all within the 20 fathoms contour, but beyond these islands the rough ground is largely at about 30 fathoms and extends a further 14 miles westward to just beyond the Smalls, a group of rocks that are awash at high tide. This rough ground between Milford Haven and St. Brides Bay covers some 75 square miles in all.

The conditions just described would indicate that there is here a very extensive area suitable for lobsters and from the experience of the French boats in this area it also supports a considerable population of crawfish.

The yield data of the area are of little help in examining the state of the lobster stocks. The numbers of lobsters, crabs and crawfish passing through Milford Haven market are given in Table 6 but as there are no data on the fishing effort which caught these lobsters, and the lobsters are an unknown proportion of those caught between Tenby and Fishguard, the changes in numbers from year to year cannot be taken to indicate the abundance of lobsters on the fishing grounds.

The fishery in this area appears to have been most active during the 1930's when some 20 boats were to a greater or lesser extent engaged in the lobster fishery between Tenby and Marloes. Fishing along the coast and out to the islands was the regular practice.

There are now only six boats fishing regularly and although five of these boats are between 24 and 36 feet long, the number of pots fished averages only 41 per boat. Most of the men fishing from Angle, Dale and Marloes are older men and there is no new blood

coming into the industry at these ports. There is, however, the pair of Milford men who take their boat north and fish from ports in the central and northern part of Cardigan Bay.

It is indicative of the lack of advance in this area that none of the boats have pot haulers.

With the great expanse of rough ground on the doorstep and one of the finest ports in Britain it is at first surprising that this fishery has not developed and is in fact smaller now than it used to be, while the development has gone on in mid-Wales where the size of the lobster stock is almost certainly considerably less per unit length of coastline. The main reason for this situation is probably the difficulty of fishing the area and particularly the more offshore grounds. The tides round the islands and out to the Smalls reach 5 knots at spring tides and, apart from the severity of the storms which beat on the coast, there is an almost continuous heavy swell which makes fishing difficult even in fine weather. It is a more dangerous coast and a more difficult one to work than most of Cardigan Bay and it is therefore understandable that men who are prepared to fish away from their home port go to central Wales while the lobster population there is still relatively lightly fished.

The spider crab (*Maia sp.*) is very common on the coast of South Wales and is said to have increased over the past 10 to 20 years. They are considered to be a nuisance by most of the fishermen, who have no use for them, except occasionally as bait.

Some of the fishermen believe that the presence of spider crabs in a pot reduces the chances of a lobster entering that pot. The only evidence available on this point is that during one day's lobster fishing from Milford Haven in 1954 a record was kept of all the animals caught in the 30 pots lifted. Of the 13 pots that contained spider crabs 7 also contained lobsters while of the 17 pots that contained no spider crabs 9 contained lobsters, in both cases just over 50%. In this small sample there was no evidence of the spider crabs keeping the lobsters out.

TENBY—SWANSEA BAY (40 MILES)

This area east of Tenby is very largely sandy. There is a narrow strip of rough ground round the Gower peninsula and there are patches of rough ground in Swansea Bay.

On the Gower coast there has been in the past a small fishery for lobsters, but at present there is no one fishing more than a few pots. A few lobsters are caught by hand round the rocks at low tide during the summer.

The rough ground in Swansea Bay appears to be worthy of examination though it seems insufficient to support more than casual fishing and no evidence has been found of a fishery there in the past.

V. RELATION WITH OTHER FISHING

On the north-east coast of England lobster fishing is only one of several types of fishing available to the inshore fishermen, lining for cod, drifting for herring, and salmon fishing being practised to a greater or lesser extent by the same men. In this way the fishermen have a source of income from their main capital investment, their boats, throughout the year.

The same general picture applies in south-west England where lining, drifting for pilchards or mackerel fishing are extensively practised by the same men as fish for lobsters and crabs. Also with several types of fishing going on from the same port there is usually a ready source of good bait at minimum cost. In both these areas crabs contribute substantially to the income of the fishermen during the time when they are using pots.

On the Welsh coast there is some trawling and seining for bottom fish from Cardiff, Swansea, Milford Haven, Caernarvon and Conway, and a number of seiners from other ports land their catches at Holyhead for despatch to London, but this fishing is almost completely done by larger boats, and only at Milford Haven does a significant amount of trawling and seining go on from the same port as lobster fishing. A little trawling is done by lobster fishermen from Pwllheli and Newquay at the end of the lobster season, but, in the absence of ice, the fish can be sold only locally and the market is soon saturated.

Mackerel come inshore for a short period during the summer and they are caught by trolling from most ports, the largest catches usually being made in St. Brides Bay and the southern and central parts of Cardigan Bay.

Some lobster fishermen combine lobster and mackerel fishing for a while and a few turn wholely to mackerel fishing for the short period that these fish are abundant in the area. Unfortunately the mackerel come at about the time of the best lobster fishing with the result that the mackerel do not help to extend the fishing season, though any change to mackerel fishing reduces the effort on the lobsters.

The possibility of developing other types of fishing during the winter would seem to merit further attention both by the industry and research, though winter fishing is likely to prove difficult from most of the present harbours, other than Holyhead, Fishguard and Milford Haven.

The Welsh coast herring fishery was at one time a very flourishing industry from Conway in the north to Milford Haven in the south but apparently through changed migration patterns of the fish, they have not been known to visit the Welsh coast in any quantity for the last forty years. However, small quantities of herring are caught inshore from time to time and it is possible that there are now more herring in the neighbourhood of the Welsh coast in winter than is appreciated.

One result of the concentration on lobster fishing and the use of salted gurnard for bait has been that crabs are probably not caught in such numbers as would be the case if fresh bait were used.

In spite of the fact that no effort is made to catch crabs, and only the best of those caught, incidental to the lobster fishing, are landed, considerable quantities still pass through Milford Haven market (Table 6). It would seem probable that there are plenty of crabs round the Welsh coast, and reports suggest that this is particularly true south of about Aberystwyth. However, in view of the extra trouble involved, very few lobster fishermen consider it worthwhile to modify their methods to include crabs. During most of the season

Table 6: *Annual sales of lobsters, crabs and crawfish at Milford Haven market*
Numbers, in hundreds
From Sea Fisheries Statistical Tables

Year	*Lobsters*	*Crabs*	*Crawfish*	*Year*	*Lobsters*	*Crabs*	*Crawfish*
1926	40	61	31	1940	74	56	12
1927	39	65	30	1941	10	0	3
1928	102	98	32	1942	13	2	2
1929	113	118	63	1943	*	*	*
1930	78	82	34	1944	10	1	0
1931	109	112	34	1945	*	*	*
1932	170	120	32	1946	*	*	*
1933	145	142	46	1947	*	*	*
1934	158	149	45	1948	*	*	*
1935	231	201	62	1949	*	*	*
1936	220	229	48	1950	139	61	2
1937	223	167	64	1951	123	40	2
1938	157	164	66	1952	175	41	4
1939	195	190	54	1953	110	66	1

*Indicates data not available.

in 1954 and 1955 crabs realised 4½d. to 6d. per lb on the Milford Haven market, around 9d. per lb at Billingsgate, and up to 1/- per lb at the holiday resorts.

There is at present no market for spider crabs and none are brought ashore.

The present landings of crawfish amount to only a few hundred a year. From past landings at Milford Haven, where in some years they reached between a third and a half of the lobster landings (Table 6), it is clear that crawfish were being caught in considerable quantities fifteen to twenty years ago and the present small landings of crawfish probably result from the fact that all the boats now fishing round the Pembrokeshire coast keep to the shallower coastal strip. The crawfish are present in deeper water which in this area was fished to a greater extent in the past. The fact that the French boats continue to work these offshore grounds and catch many crawfish also indicates that stocks are substantial.

In the south of Ireland there has been a large increase in the export of shellfish to France and it may be that this market, which prefers crawfish to lobsters, might be tapped for the sale of crawfish from South Wales. There seems no technical reason why lobsters brought to the Milford Haven area should not be stored in enclosures of the sea or tanks until sufficient quantities have been accumulated for despatch by ship, well-boat, or air.

VI. DISCUSSION AND CONCLUSIONS

This survey has shown that there are extensive rough grounds off the more exposed parts of Pembrokeshire, Anglesey and the Lleyn peninsula that may be expected to carry lobster populations comparable to some of the heavily fished lobster grounds of the north-east and south-west of England. The post-war expansion of the Welsh lobster fishing has, however, been greatest in the more sheltered and easily fished Cardigan Bay where the rough ground does not extend so far from the coast, and is generally more patchy.

The area in which the fishing has had most effect on the stock in reducing the mean size of the lobsters caught and the catch per boat is in the northern part of Cardigan Bay between Criccieth and Abersoch. Increased fishing inevitably has these effects in any area and the question arises whether the point has been reached at which the stocks are becoming over-fished. To answer this requires either detailed statistics of at least landings and fishing effort over a number of years, or information on lobster movements, growth rates, and natural and fishing mortality rates. The former are not available and the results of a study of the latter in the Pwllheli area (Simpson, in press) are unfortunately inconclusive. They do, however, suggest that, although the fishing and 'natural' deaths are removing during the season some 58% of the lobsters that were present at the beginning of the season, this is not likely to prove to be biological overfishing, i.e., where increased fishing in the area would give a reduced annual yield from all the boats put together.

Whether the fishery there remains profitable is, however, a very different matter, depending to a great extent on economic factors such as the cost of catching the lobsters, the extent to which the fishing yields other sources of income, such as from crabs, the duration of the fishing season and the extent to which the proceeds from the lobster season are expected to provide income for the season when there is no lobster fishing. On the coast of Wales the lobster season is typically of about five months for the smaller boats and rarely more than seven months for the larger boats.

Even if in the Pwllheli area the stock of lobsters is being exploited as heavily as is economically sound, the stocks elsewhere on the coast do not show evidence of unduly heavy exploitation and the occasional reports of 'overfishing' of small areas appear to be due to the fishing being concentrated on the coastal strip when spreading the effort to neighbouring, slightly more offshore grounds, would result in obtaining a higher yield. This appears particularly to apply to the Lleyn peninsula between Rhiw and Nevin. It must also be remembered that after moulting is complete in the early or mid-summer there is little recruitment into the fishery by growth or migration, and the numbers of lobsters available to be caught must inevitably tend to fall during the rest of the season.

Turning to the ways in which the fishery might be expected to develop, several generalisations can be made.

The most successful units at present appear to be the 18 to 25 foot part-decked boat worked by one man fishing 40 to 60 pots, and the 25 to 36 foot part- or fully-decked boat worked by two men, fishing between 70 and 120 pots. There are less than ten of the former and only some fifteen of the latter on the whole Welsh coast and there would appear to be considerable scope for an increase in the number of such units. Off the south-west of Wales and off Anglesey, where the coast is more exposed and rugged with rough ground extending beyond the 20 fathom line there would appear to be a place for boats, possibly of greater size and speed, capable of working pots in these depths, including areas where the tides are strong. In such areas it might prove necessary to use larger floats like the canvas ones, comparable to herring buffs, used on the Northumberland coast, and small anchors or pieces of chain on the ends of the back ropes to prevent the pots being shifted and the movement of the buoy ropes being transmitted to the pots, as is frequently practised in Cornwall and the Channel Islands. Such gear, also using longer buoy ropes, would make the use of capstans a necessity, and may be only really practicable working from Milford Haven, Fishguard and Holyhead where safe harbourage is available under all conditions for the larger boats.

There is no particular method of working pots that suits all conditions, and a great variety of detail is likely always to be a feature of lobster fishing, especially on a coast so variable in features and harbour facilities as that of Wales.

VII. SUMMARY

1. After an account of the history of lobster fishing on the Welsh coast since 1800, the present fishery is described in detail.
2. The distribution of the rough ground round the Welsh coast is compared with that on the north-east coast of England and round the counties of Devon and Cornwall. It is concluded that on topographical considerations the Welsh coast is likely to carry between a half and three-quarters of the lobster population of either of the other two areas.
3. The yields and potentialities for lobster fishing off the Welsh coast are discussed by areas and it is considered that the stock of lobsters off Pwllheli is the most intensely fished, that the area from Aberayron to Fishguard comes next, with the rest of the coast relatively lightly fished.
4. Lobster fishermen on the Welsh coast participate in little other fishing excepting that for mackerel. It is considered that the fishing would benefit from any extension of the lobster season or the development of other fishing by the same or other boats. The potentialities of increased crab and crawfish fishing are discussed.

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APPENDIX I

Analysis of boats and gear used by lobster fishermen on the Welsh coast in 1954/55

(1) *Port*	(2) *Total Crew*	(3) *Overall Length (feet)*	(4) *Decking (Full) (part) (open)*	(5) *Motor Inboard (In) or Outboard (Out)*	(6) *Pot Hauler*	(7) *POTS* *No. (average per season)*	(7) *POTS* *Type*	(8) *No. of pots on each line*	(9) *No. of lifts per day in fine weather*	(10) *SEASON* *Start*	(10) *SEASON* *End*	(11) *Part- or full-time lobstering during season*	(12) *Kind of bait used*
Llandudno	2	24	Open	In	No	40	Large creel	1	2	mid Mar.	mid Oct.	Full	Plaice, dabs
Conway	Some 30 pots worked by 2 part-timers												
Penmon	2	16	Open	Out	No	15–20	Creel	1	1	April	Aug.	Part	Plaice, whiting
North East coast of Anglesey	About 100 pots worked by about 10 part-timers from rowing boats												
Moelfre	2	15	Open	Out	No	15–20	Cornish, hazel	1	1	mid May	mid Sept.	Part	Fish frames
Hen Borth	1	13	Open	Rowing	No	20	Scottish creel, soft eye	1	1	mid May	mid Sept.	Part	Gurnard
Bull Bay	2	15	Open	Out	No	20–30	Cubic, wire, wood	1	1	April	Sept.	Part	Fish frames
Llanrhyddlan (Church Bay)	1	12	Open	Rowing	No	14–18	Scottish creel, soft eye	1	1	mid April	end Sept.	Part	Dabs, gurnard
Holyhead (a)	2	28	Open	In	No	70	Cubic, wire, wood	1	1	Jan.	Dec.	Full	Gurnard
(b)	1	27	Part	In	No	25	Cornish, also wire and wood	1	1	mid May	end Aug.	Part	Fish frames, gurnard
	Also about 50 pots fished by about 4 part-timers												
Treaddur Bay	1	12	Open	Rowing	No	18–20	Misc.	1	1	mid Mar.	mid Sept.	Part	Dogfish, bream, frames
Cwmyran	2	18	Open	Out	No	50	Cubic, wood and wire	1	1	mid May	end Aug.	Full	Gurnard, own caught

APPENDIX 1—*continued*

(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)
Amlwch . . .	2	18	Open	In	No	35–45	Cornish willow	1	1	mid Mar.	end Sept.	Part	Dabs, dogfish
Cemaes (a) . . .	1	15	Open	In	No	25	Creel, wire, wood	1	2	early May	mid Sept.	Part	Gurnard, fish frames
(b) . . .	2	19	Open	In	No	40	Cubic, wire, wood	1	1	early May	mid Sept.	Full	Fish frames
(c) . . .	2	21	Open	In	No	20	Cubic, wire, wood	1	1	July	Aug.	Part	Fish frames
Rhosneigr . . .	1	15	Open	Out	No	20	Misc.	1	1 or 2	April	mid Aug.	Part	Self caught and frames
Trevor . . .		Part-time fishing by quarry men and others, reaching a total of about 40 pots								June	Sept.		
Nevin . . .		Part-time fishing by some 4 boats, 50 pots								June	Sept.		
Porth Dinlleyn . .	2	21	Open	In	Yes	50–60 12	Scottish creel, wood and twine Scottish creel, iron and netting	1	1	mid April	early Oct.	Full	Dogfish, etc., self caught
Porth Ysgadan . .	1	14	Open	Out	No	25–30	15 Cornish cane 10 withy, Cornish spherical	1	1	April	early Oct.	Part	Mixed catches, own with trammel
		Also some 30 pots by part-timers, each using 5–12											
Whistling Sands (Porth Oer) . .	1	14	Open	Out	No	25–30	Cornish 10 cane 15 withy	1	1	end April	mid Sept.	Part	Mixed catches, own with trammel
Bardsey Is. (a) . .	1	13	Open	In	No	30–40	Cornish spherical withy	1	2	mid April	end Sept.	Part	Dogfish, etc., trammel
(b) . .	2	15	Open	Out	No	30	Cornish cane	1	1	mid April	end Dec.	Part	Dogfish, etc., trammel
(c) . .	1	14	Open	Out	No	30–35	Cornish cane	1	1 or 1	May	early Sept.	Part	Dogfish, etc., catches own

APPENDIX 1—*continued*

(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)
Aberdaron (a) . .	2	14	Open	Out	No	45–50	Spherical Cornish withy	1 or 2	1	early April	mid Dec.	Full	Dogfish, etc.
(b) . .	2	14	Open	Out	No	40–50	Spherical Cornish withy	1	1	early April	mid Dec.	Full	Dogfish, etc.
Porth Cadlan . .	1	15	Open	Out	No	40–50	Cornish cane	1 or 2	1	mid May	mid Sept.	Full	Salt gurnard and self caught dog, etc.
Rhiw . . .	1	14	Open	Out	No	20	Spherical Cornish withy	1	1	mid May	mid Sept.	Part	Self caught misc.
Abersoch (a) . .	1	32	Part	In	No	50	Cornish cane	4	2	mid May	end Oct.	Full	Gurnard
(b) . .	2	40	Full	In	Yes	60	Cornish cane	3–4	1	April	Sept.	Full	Gurnard
(c) . .	1	14	Open	In	No	25–30	Cornish cane	2	1	April	Sept.	Full	Gurnard
Porth Bach (a) . .	1	12	Open	Out	No	20	Cornish cane	1	1	April	Sept.	Part	Gurnard
(b) . .	1	10	Open	Out	No	20	Cornish cane	1	1	April	Sept.	Part	Gurnard
Porth Caerad (a) . .	1	12	Open	Rowing	No	20	Cornish cane	1	1	April	Sept.	Part	Gurnard
(b) . .	1	10	Open	Rowing	No	20	Cornish cane	1	1	April	Sept.	Part	Gurnard
Llanbedrog . .	2	33	Part	In	Yes	80	Cornish cane	4	1	early April	early Nov.	Full	Gurnard
Pwllheli (a) . .	2	33	Full	In	Yes	70	Cornish cane	4	1	12 April	14 Oct.	Full	Gurnard
(b) .	1	25	Part	In	No	40	25 Cornish cane 15 Scottish creel	2	1	early May	mid Oct.	Full	Gurnard
(c) . .	1	36	Part	In	Yes	20–30	Cornish cane	3	1	mid Sept.	mid Jan.	Full	Gurnard
Abererch . . .	1	12	Open	Out	No	20	Cornish cane	1 or 2	1	early May	mid Sept.	Part	Frames, dogfish

APPENDIX 1—*continued*

(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)
Chwilog . . .	1	11	Open	Out	No	25	Cornish cane	1	1	May	Sept.	Part	Fish heads, etc.
Criccieth (a) . .	1	12	Open	Out	No	30	Creel	1	1	May	Sept.	Part	Fish heads, etc.
(b) . .	1	28	Open	In	No	60	Creel	2	1	mid May	end Sept.	Part	Fish heads
Pensarn . . .	2	31	Part	In	No	40	Creel	?	1	June	Sept.	Part	?
Barmouth (a) . .	2	32	Part	In	No	80–100	Cornish wire	10–15	2–4	May	end Dec.	Full	Gurnard
(b) . .	2	36	Open	In	No	70–80	Cornish wire	10	2–4	April	early Dec.	Full	Gurnard
Aberdovy . . .	2	35	Part	In	No	40–50	Creel	10	1–2	May	Sept.	Part	Gurnard, fish heads
Aberystwyth (a) . .	2	28	Part	In	Yes	90	Cornish wire	15	2–3	mid May	end Nov.	Full	Gurnard
(b) . .	2	27	Part	In	No	40	Creel, soft eye	15	1	May	Sept.	Part	Gurnard
(c) . .	2	27	Part	In	No	45	Cornish wire	10	2	May	Sept.	Full	Gurnard
(d) . .	2	28	Open	In	No	30	Misc.	10	1 or 2	May	Sept.	Part	Gurnard
	Also about 50 pots by other part-timers												
Aberayron . . .	2	27	Open	In	No	80	Cornish wire and twine	10	1	mid April	end Sept.	Full	Gurnard
Newquay (a) . .	2	29	Part	In	Yes	75	Cornish wire and twine	10	1 or 2	mid April	early Oct.	Full	Gurnard, offal
(b) . .	2	29	Part	In	Yes	100–120	Cornish wire and twine	10	2	mid April	early Oct.	Full	Gurnard
(c) . .	2	23	Full	In	No	40	Cornish wire and twine	10	2	mid April	early Oct.	Full	Gurnard
Llangranog . .	About 15 pots by part-timers												

APPENDIX 1—*continued*

(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)	(9)	(10)	(11)	(12)
Tresaith . . .		About 15 pots by part-timers										
Aberporth . . .		About 35 pots by part-timers										
Fishguard (a) . .	2	28	Part	In	Yes	75	Cornish wire and twine	15	2	early May end Sept.	Full	Gurnard
(b) . .	2	36	Part	In	Yes	75	Cornish wire and twine	15	2	mid May end Sept.	Full	Gurnard
		Also some 70 pots by part-timers										
Porth Gain (a) . .	2	23	Open	In	No	40	Cornish wire	10	1	mid May end Sept.	Part	Gurnard
(b) . .	2	24	Open	In	No	46	Cornish wire	3 of 10 2 of 8	2	early May mid Sept.	Full	Gurnard
(c) . .	2	24	Open	In	No	40	Cornish wire	10	1	June end Sept.	Part	Gurnard
		Also some 30 pots worked by 3 men										
Abereiddy (a) . .	2	30	Part	In	Yes	75	Cornish wire	15	2	mid May end Sept.	Full	Gurnard
(b) . .	2	22	Open	In	No	50	Cornish	10	1	mid May mid Sept.	Part	Gurnard
Porth Stinian (a) . .	1	26	Part	In	Yes	30	Cornish wire	10	2	May Sept. June Oct.	Part	Gurnard
(b) . .	1	20	Open	In	No	30	Cornish wire	11 of 2 1 of 8	1	early May end Sept.	Part	Gurnard
Porth Clais (a) . .	1	22	Part	In	Yes	36	Cornish withy	3 of 8 1 of 4 8 singly	2	16 April early Oct.	Full	Gurnard
(b) . .	1	28	Part	In	Yes	30–40	Cornish wire	6	1 or 2	early April end Sept.	Part	Gurnard
		Also about 40 pots worked by about 6 boats										

APPENDIX 1—*continued*

(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)		(11)	(12)
Solva (a) . . .	3	28	Part	In	Yes	120	Cornish wire	10–15	2–3	mid April	mid Sept.	Full	Gurnard
(b) . . .	1	22	Open	In	No	20	Cornish wire	6–8	1	mid April	mid Sept.	Part	Gurnard
(c) . . .	1	18	Open	In	No	15–20	Cornish wire	2–3	1	mid April	mid Sept.	Part	Gurnard
(d) . . .	1	18	Open	In	No	15–20	Cornish wire	2–3	1	mid April	mid Sept.	Part	Gurnard
(e) . . .	2	18	Open	In	No	20	Cornish wire	2–3	1	mid April	mid Sept.	Part	Gurnard
(f) . . .	1	24	Part	In	No	35	Cornish wire	6–8	1 or 2	June	mid Sept.	Part	Gurnard
		Also about 30 pots worked by part-timers											
Marloes . . .	1	14	Open	Out	No	30	10 barrel top entrance 10 Cornish withy 10 Barrel (Angle type)	4	1	May	end Sept.	Full	Gurnard
Dale . . . . (Milford Haven)	2	26	Open	In	No	40–50	20 Cornish withy 20 Cornish wire 5 Barrel, top eye	10	1 or 2	mid May	mid Sept.	Full	Gurnard
Angle (a) . . . (Milford Haven)	2	24	Open	In	No	40	Barrel (Angle type)	Singly	1 or 2	mid May	mid Sept.	Full	Gurnard
(b) . . .	2	30	Part	In	No	50–60	Barrel (Angle type)	Singly	1 or 2	mid April	mid Sept.	Full	Gurnard
Stackpole Quay . .	2	27	Open	In	No	40	Barrel (Angle type)		1 or 2	mid May	end Sept.	Full	Gurnard
Tenby . . .	2	35	Full	In	No	36	Cornish wire	3 of 10 1 of 6	2	May	mid Sept.	Part	Gurnard
		Also about 40 pots by about 4 men											

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